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distinguishable, intermediate forms occur. The more delicate type is well supplied with tactile hairs.

The author believes the delicate type of chela to be the more primitive of the two. He rejects the explanation that it is a cutting jaw as contrasted with a crushing jaw, and believes that it represents an ornamental structure. The rhythmical arrangement of its teeth is dwelt upon, and he suggests that as a crustacean's eye plays over such a series it may receive agreeable impressions. The paper is well written in that the observational and theoretic parts are clearly separated.

G. H. P.

**Cestodes of Aplacentalia.** — Zschokke has just published[1] a most important article on the anoplocephaline cestodes, the immediate occasion of which was the examination of material brought from Celebes by the Sarasins. The specimens, fortunately well preserved, were taken from *Phalanger ursinus*, and represented two closely allied species of the genus Bertia. They proved to be new and were named *B. edulis* and *B. sarasinorum*. Regarding the specific name, *edulis*, Zschokke says that according to the report of the Sarasins, who obtained repeated and unimpeachable evidence of the fact, the tapeworms of Phalanger are hunted and eaten with gusto by the natives of Celebes. "Phalanger appears, by virtue of its parasites, to be subjected to more than one disadvantage!"

The anatomical structure of the two species is treated in detail. *B. edulis* is a large form, 660 mm. long with 1500 proglottids; *B. sarasinorum* has, on the contrary, a maximum length of 70 mm., with only 220 proglottids. Further differences are found in the manner of union of the excretory loops in the scolex, in the number, size, and arrangement of the sexual organs, and in many minor points, so that despite their similarity the two are undoubtedly good species. Closely related to them is *Tænia obesa* from *Phascolarctus cinereus*, while somewhat similar are *T. echidnæ* from *Echidna hystrix*, and *T. semoni* from *Perameles obesula*. Information on all of these forms comes from previous studies by Zschokke.[2] *T. festiva*, described in 1819 by Rudolphi from *Macroperus giganteus*, is undoubtedly an anoplocephaline form, probably of the genus Moniezia; it is only imperfectly known.

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[1] Zschokke, F. Neue Studien an Cestoden aplacentaler Säugethiere, *Zeitschrift f. wiss. Zool.*, Bd. lxv, 3, pp. 404–445, Pls. xx, xxi, 1899.

[2] Die Cestoden der Marsupialia und Monotremata, *Semon, Zool. Forschungsreisen, Jenaische Denkschriften*, Bd. viii, 1898.

After an extensive and valuable discussion of the anatomical features of agreement and difference between the five species noted above, Zschokke enters upon a critical review of the subfamily Anoplocephalinæ. Of family characters the so-called pyriform apparatus of the inner shell is certainly variable and available at most for the determination of species. On the other hand, the presence of three shells is clearly distinctive.

All cestodes yet described from aplacental mammals belong to the Anoplocephalinæ, even those which are incompletely known. In that family these five species occupy a separate position, being clearly distinct from the Anoplocephalinæ of ruminants and certain apes, the genera Moniezia, Thysanosoma, Stilesia, from those of many perissodactyles and some rodents, the genus Anoplocephala, and from those of rodents, the genera Cittotænia and Andrya. There remains for their reception only the heterogeneous genus Bertia, and with this the *obesa-edulis-sarasinorum* group agrees in main features, constituting a distinct natural subdivision of the genus. The group *echidnæ-semoni* departs from Bertia, however, in not unimportant respects in which it is also unlike all other anoplocephaline cestodes, so that a new genus, Linstowia, is formed for these species. Prominent among the points characterizing it is the location of the vagina and vas deferens ventral to the longitudinal excretory canals and lateral nerve trunk, and of the narrow dorsal vessel marginal to the broad ventral vessel. In full agreement with repeated utterances of Stiles, Zschokke emphasizes here the taxonomic importance of the relative position of genital and excretory canals and longitudinal nerve trunks.

The diagnosis of the genus Bertia is rewritten in the light of this discussion and its species classed in three groups, of which only a single feature need be noted here. (*a*) Dorsal excretory canals remain actually dorsal to the ventral canals. Hosts, apes; species *B. mucronata* and *B. conferta* Meyner. (*b*) Dorsal canals lateral to ventral. Rodents. *B. americana* Stiles. (*c*) Dorsal canals mesal to ventral. Marsupials. *B. obesa*, *B. edulis*, *B. sarasinorum* Zschokke, and probably also *B. plastica* Sluiter from *Galeopithecus volans*. The type of the genus, *B. studeri* R. Bl., and *B. satyri* are so incompletely known that their position, as also the precise form of the genus, must remain at present uncertain.

For the new genus Linstowia, of which a summary diagnosis is also given, *L. echidnæ* A. W. Thompson is taken as type, and *L. semoni* Zschokke also included. Noteworthy is the fact that Linstowia, while resembling the different groups of the genus Bertia, in individual respects, is yet relatively furthest removed from that group which is found in marsupials.

In a summary the author notes that all Tæniæ at present known from aplacental mammals belong to the subfamily Anoplocephalinæ, which is typical for herbivors, and are found in three genera, Moniezia, Bertia, Linstowia. Between the Anoplocephalinæ of placental and aplacental mammals there exists a certain anatomical parallel, corresponding to the similarity in their manner of life and nutrition. Pure herbivors, such as ruminants and the giant kangaroo, harbor the genus Moniezia. The marsupials, Phascolarctus, Phalanger, as also the placental Galeopithecus, live on leaves, fruits, and rarely also on insects; in them is parasitic a well-circumscribed subgroup of the genus Bertia. Finally the aplacental insectivors, Echidna and Perameles, are inhabited by a special genus Linstowia, for which a parallel from Placentalia is not at present known. H. B. W.

**Histology and Physiology of the Gastræadæ.**—Under this head T. Garbowski[1] describes the results of some recent observations on *Trichoplax adhærens* F. E. Schulze, on which he bases certain theoretical conclusions.

He finds the body epithelia covered with a several-layered cuticle, through which project the cilia. Contrary to the statement of Schneider, these cilia are not continuous within the cytoplasm, but, as is shown by impregnation with gold chlorid, are merely outer processes of the cells. It is conclusively shown that the ventral epithelium possesses no digestive power. This function is assumed by certain cells of the loose body parenchyma. Undoubtedly only liquid food is assimilated, chiefly organic decomposition products. Other cells of the parenchyma, becoming fibrous in character, take a dorso-ventral arrangement and act as muscles. The so-called muscles of von Graff appear as artifacts under the action of certain chemical reagents.

The large spheres, regularly arranged in the parenchyma and usually described as fat bodies, are shown to be the intercellular excretory products of the animal and are closely comparable to the excretory vacuoles of the larger amœbæ. Those other yellowish brown globules, which have been variously interpreted as otoliths, spermatoblasts, etc., are more probably specimens of a symbiotic alga, Zooxanthella.

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[1] Zur Histologie und Physiologie der Gastraeaden, *Bull. Internat. de L'Académie des Sciences de Cracovie,* February, 1899, pp. 87–98.